Watts Air Preparation Systems & Accessories
QUBE, General Line, QIX, Miniature, Stainless, Injection Lubricators & Accessories
Catalog 0305-2
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# Air Preparation Systems

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<tr>
<td>Safety Guide, Offer of Sale</td>
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</tr>
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</table>
Stainless Steel

FRLs

Air Preparation Units

Section D

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- Standard F10 ..................................................D4-D5

Air Line Coalescing Filters
- Miniature F501 ................................................D6-D7
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- Miniature B548, B558 ........................................D14-D15
- Standard B11, B12 ..........................................D16-D17

Air Line Lubricators
- Standard L10 ..................................................D18-D19
F504 Filter – Miniature

Features
- Stainless Steel Construction Handles Most Corrosive Environments
- Fluorocarbon Seals Standard
- Meets NACE Specifications MR-01-75/ISO 15156
- 1/8” Female Threaded Drain
- High Flow: 1/4” - 23 SCFM

<table>
<thead>
<tr>
<th>Port Size</th>
<th>NPT</th>
<th>BSPP</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/4”</td>
<td>F504-02DHSS</td>
<td>F504G02DHSS</td>
</tr>
</tbody>
</table>

Bold Items are Most Popular.
For other models refer to ordering information below.

\[ \text{SCFM} = \text{Standard cubic feet per minute at 90 PSIG inlet and 5 PSIG pressure drop.} \]

F504 Filter Dimensions

<table>
<thead>
<tr>
<th>A (inch)</th>
<th>C (inch)</th>
<th>D (inch)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1.56 (40)</td>
<td>0.31 (8)</td>
</tr>
<tr>
<td></td>
<td>3.69 (94)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>E (inch)</th>
<th>F (inch)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>4.00 (102)</td>
<td>1.58 (40)</td>
</tr>
</tbody>
</table>

F504 Series
1/4 Inch Ports

Ordering Information

<table>
<thead>
<tr>
<th>Port Type</th>
<th>Port Size</th>
<th>Bowl</th>
<th>Element</th>
<th>Options</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>– NPT</td>
<td>02 1/4 Inch</td>
<td>D Metal Bowl without Sight Gauge</td>
<td>H 20 Micron G 5 Micron</td>
<td>Blank Manual Twist Drain R Automatic Pulse Drain</td>
<td>SS Stainless Steel</td>
</tr>
</tbody>
</table>

BOLD ITEMS ARE MOST POPULAR.
**Technical Specifications – F504**

**Operation**

![Diagram of F504 Filter](image)

**F504 Filter Kits & Accessories**

- **Drain Kits** –
  - Automatic Pulse Drain: RK504SY-SS
  - Manual Twist Drain:
    - Small (Old): SA600Y7-1SS
    - Large (New): SAP05481

- **Filter Element Kits** –
  - Particulate (5 Micron): EK504YV
  - Particulate (20 Micron): EK504Y

- **Pipe Nipple** –
  - 1/4" 316 Stainless Steel: 616Y28-SS

**Specifications**

- **Bowl Capacity**: 1.0 Ounces
- **Filter Rating**: 20 Micron
- **Sump Capacity**: 0.4 Ounce
- **Port Threads**: 1/4 Inch

**Pressure & Temperature Ratings** –

- **Manual Twist Drain**: 0°F to 300°F (-18°C to 82°C)
- **Auto Pulse Drain**: 0°F to 175°F (-18°C to 66°C)

**Note**: Air must be dry enough to avoid ice formation at temperatures below 32°F (0°C).

**Materials of Construction**

- **Body**: 316 Stainless Steel
- **Bowls**: 316 Stainless Steel
- **Deflector**: Acetal
- **Drain**: 316 Stainless Steel
- **Element Holder**: Acetal
- **Filter Element**: Polyethylene
- **Seals**: Fluorocarbon

---

**F504 Series**

**Air Line Filters**

**First Stage Filtration**:
Air enters at inlet port and flows through deflector plate (A) which causes a swirling action. Liquids and coarse particles are forced to the bowl interior wall (B) by the centrifugal action of the swirling air. They are then carried down the bowl wall by the force of gravity. The baffle (D) separates the lower portion of the bowl into a “quiet zone” (E) where the removed liquid and particles collect, unaffected by the swirling air, and are therefore not reentrained into the flowing air.

**Second Stage Filtration**:
After liquids and large particles are removed in the first stages of filtration, the air flows through element (C) where smaller particles are filtered out. The filtered air then passes downstream. Collected liquids and particles in the “quiet zone” (E) should be drained before their level reaches a height where they would be reentrained in the flowing air. This can be accomplished by unscrewing the drain valve (F) slightly until the liquid begins to drain.
F10 Filter – Standard

Features

- Stainless Steel Construction Handles Most Corrosive Environments
- Meets NACE Specifications MR-01-75/ISO 15156
- 1/8” Female Threaded Drain
- Low Temperature Version Available
- High Flow: 1/2” - 70 SCFM

<table>
<thead>
<tr>
<th>Port Size</th>
<th>NPT Manual Twist Drain</th>
<th>NPT Automatic Float Drain</th>
<th>BSPP Manual Twist Drain</th>
<th>BSPP Automatic Float Drain</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/2”</td>
<td>F10-04WJSS</td>
<td>F10-04WJRSS</td>
<td>F10G04WJSS</td>
<td>F10G04WJRSS</td>
</tr>
</tbody>
</table>

Bold Items are Most Popular.
For other models refer to ordering information below.

1 SCFM = Standard cubic feet per minute at 90 PSIG inlet and 5 PSIG pressure drop.

Optional Sight Gauge

F10 Filter Dimensions

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>A1</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2.38 (60)</td>
<td>2.50 (64)</td>
<td>1.75 (44)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>C</th>
<th>D</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>.56 (14)</td>
<td>5.00 (127)</td>
<td>5.56 (141)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2.12 (54)</td>
</tr>
</tbody>
</table>

Ordering Information

F10 — 04 W J SS

- Port Type: NPT G BSPP
- Port Size: 04 1/2 Inch
- Bowl: D Metal Bowl without Sight Gauge W Metal Bowl with Sight Gauge
- Element: J 40 Micron G 5 Micron
- Options: Blank Manual Twist Drain R Automatic Float Drain
- Material: SS Stainless Steel

BOLD ITEMS ARE MOST POPULAR.
### Operation

First Stage Filtration:
Air enters at inlet port and flows through deflector plate (A) which causes a swirling action. Liquids and coarse particles are forced to the bowl interior wall (B) by the centrifugal action of the swirling air. They are then carried down the bowl wall by the force of gravity. The baffle (D) separates the lower portion of the bowl into a “quiet zone” (E) where the removed liquid and particles collect, unaffected by the swirling air, and are therefore not reentrained into the flowing air.

Second Stage Filtration:
After liquids and large particles are removed in the first stages of filtration, the air flows through element (C) where smaller particles are filtered out. The filtered air then passes downstream. Collected liquids and particles in the “quiet zone” (E) should be drained before their level reaches a height where they would be reentrained in the flowing air. This can be accomplished by unscrewing the drain valve (F) slightly until the liquid begins to drain.

### Technical Information

<table>
<thead>
<tr>
<th>Pressure Drop - bar</th>
<th>Flow - SCFM</th>
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</thead>
<tbody>
<tr>
<td>0.1</td>
<td>10</td>
</tr>
<tr>
<td>0.2</td>
<td>20</td>
</tr>
<tr>
<td>0.3</td>
<td>30</td>
</tr>
<tr>
<td>0.4</td>
<td>40</td>
</tr>
<tr>
<td>0.5</td>
<td>50</td>
</tr>
<tr>
<td>0.6</td>
<td>60</td>
</tr>
<tr>
<td>0.7</td>
<td>70</td>
</tr>
<tr>
<td>0.8</td>
<td>80</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Pressure Drop - PSIG</th>
<th>Flow - dam/s</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.7</td>
<td>25 PSIG</td>
</tr>
<tr>
<td>3.4</td>
<td>50 PSIG</td>
</tr>
<tr>
<td>5.2</td>
<td>75 PSIG</td>
</tr>
<tr>
<td>6.9</td>
<td>100 PSIG</td>
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</tbody>
</table>

### F10 Filter Kits & Accessories

**Drain Kits**
- Automatic Float Drain .......................................... SA10MDSS
- Manual Twist Drain–
  - Small (Old) ................................................. SA600Y7-1SS
  - Large (New) .................................................. SAP05481

**Filter Element Kits**
- Particulate (40 Micron) .......................................... EK55J
- Particulate (5 Micron) .......................................... EK55G

**Pipe Nipple** – 1/2” 316 Stainless Steel....................... 616A28-SS

### Specifications

- **Bowl Capacity** .................................................. 4.0 Ounces
- **Filter Rating** ................................................... 40 Micron
- **Sump Capacity** .................................................. 1.7 Ounce
- **Port Threads** ................................................... 1/2 Inch
- **Pressure & Temperature Ratings** –
  - Manual Twist Drain (D) ...................................... 0 to 300 PSIG (0 to 20.7 bar) 0°F to 180°F (-18°C to 82°C)

**Manual Twist Drain (W) ...................................... 0 to 50 PSIG (0 to 17.1 bar) 0°F to 150°F (-18°C to 66°C)

**Automatic Float Drain ........................................ 15 to 175 PSIG (1 to 12 bar) 32°F to 150°F (0°C to 66°C)

**Note:** Air must be dry enough to avoid ice formation at temperatures below 32°F (0°C).

**Weight** ............................................................ 1.9 lb. (0.85 kg)

### Materials of Construction

- **Body** ............................................................ 316 Stainless Steel
- **Bowls** ........................................................... 316 Stainless Steel
- **Deflector** ....................................................... Acetal
- **Drain** ............................................................ 316 Stainless Steel
- **Element Holder** ................................................ Acetal
- **Filter Element** ................................................ Polyethylene
- **Seals** ............................................................ Fluorocarbon
- **Sight Gauge** .................................................... Isoplast
F501 Coalescing Filter – Miniature

Features

- Stainless Steel Construction Handles Most Corrosive Environments
- Meets NACE Specifications MR-01-75/ISO 15156
- 1/8” Female Threaded Drain
- High Flow: 1/4” - 16 SCFM

<table>
<thead>
<tr>
<th>Port Size</th>
<th>NPT</th>
<th>BSPP</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/4”</td>
<td>F501-02DHSS</td>
<td>F501G02DHSS</td>
</tr>
</tbody>
</table>

Bold Items are Most Popular.
For other models refer to ordering information below.

1 SCFM = Standard cubic feet per minute at 90 PSIG inlet and 5 PSIG pressure drop.

Ordering Information

F501 — 02 D H SS

Port Type
- NPT
- BSPP

Port Size
- 02 1/4 Inch

Bowl
- D Metal Bowl without Sight Gauge

Element
- H .3 Micron

Options
- Blank
- Manual Twist Drain
- R Automatic Pulse Drain

Material
- SS Stainless Steel

F501 Coalescing Filter Dimensions

<table>
<thead>
<tr>
<th>A</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.56</td>
<td>0.31</td>
<td>3.69</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>E</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.00</td>
<td>1.58</td>
</tr>
</tbody>
</table>

inches

Bold Items are Most Popular.
Technical Specifications – F501

Operation

The contaminated air enters the element interior and is forced through a thick membrane (A) of “borosilicate” glass fibers coated with epoxy. Flow then passes through the element, and at this stage 99.97% of the submicron particles have been removed from the air stream. The tiny droplets coalesce together and are collected from the filter element by the outer drain layer. The clean, filtered air now passes through and out into the pneumatic system. The air line coalescing filter removes liquid aerosols and sub-micron particulate matter. Collected liquids and particles in the “quiet zone” (B) should be drained before their level reaches a height where they would be reentrained in the flowing air. This can be accomplished by unscrewing the drain valve (C) slightly until the liquid begins to drain.

Technical Information

Pressure & Temperature Ratings –
Manual Twist Drain ............................ 0 to 300 PSIG (0 to 20.7 bar)
0°F to 180°F (-18°C to 82°C)
Auto Pulse Drain ................................. 10 to 175 PSIG (0 to 12 bar)
3°F to 150°F (0°C to 66°C)

Note: Air must be dry enough to avoid ice formation at temperatures below 32°F (0°C).

Weight ......................................................... 0.6 lb. (0.27 kg)

Materials of Construction

Body ......................................................... 316 Stainless Steel
Bowls ....................................................... 316 Stainless Steel
Drain ......................................................... 316 Stainless Steel
Element Holder ....................................... Acetal
Filter Element ......................................... Borosilicate Fiber
Seals ....................................................... Fluorocarbon

F501 Filter Kits & Accessories

Drain Kits –
Automatic Pulse Drain ................................. RK504S-Y-SS
Manual Twist Drain –
Small (Old) .................................................. SA600Y-7-1SS
Large (New) ............................................... SAP0581

Filter Element Kits –
0.3 Micron .................................................. EKF501H

Pipe Nipple –
1/4” 316 Stainless Steel ................................. 616Y28-SS

Specifications

Bowl Capacity ........................................... 1.0 Ounces
Filter Rating ............................................ 0.3 Micron
Sump Capacity ........................................ 0.4 Ounce
Port Threads ......................................... 1/4 Inch
F11 Coalescing Filter – Standard

Features

- Stainless Steel Construction Handles Most Corrosive Environments
- Meets NACE Specifications MR-01-75/ISO 15156
- 1/8” Female Threaded Drain
- Low Temperature Version Available
- High Flow: 1/2” - 45 SCFM

<table>
<thead>
<tr>
<th>Port Size</th>
<th>NPT Manual Twist Drain</th>
<th>NPT Automatic Float Drain</th>
<th>BSPP Manual Twist Drain</th>
<th>BSPP Automatic Float Drain</th>
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</thead>
<tbody>
<tr>
<td>1/2&quot;</td>
<td>F11-04WJSS</td>
<td>F11-04WJRSS</td>
<td>F11G04WJSS</td>
<td>F11G04WJRSS</td>
</tr>
</tbody>
</table>

Optional Sight Gauge

Distance Required To Remove All Bowls Regardless of Drain Option

F11 Coalescing Filter Dimensions

<table>
<thead>
<tr>
<th>A</th>
<th>A1</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
</tr>
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<tbody>
<tr>
<td>2.38</td>
<td>2.50</td>
<td>1.75</td>
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</tr>
<tr>
<td>(60)</td>
<td>(64)</td>
<td>(44)</td>
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<td></td>
</tr>
<tr>
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</tr>
<tr>
<td>(54)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Port Size (inches) (mm)

Ordering Information

F11 — 04 W J SS

- Port Type — NPT G BSPP
- Port Size 04 1/2 Inch
- Bowl D Metal Bowl without Sight Gauge W Metal Bowl with Sight Gauge
- Element J .01 Micron
- Options Blank Manual Twist Drain R Automatic Float Drain
- Material SS Stainless Steel

Bold Items are Most Popular.

For other models refer to ordering information below.

SCFM = Standard cubic feet per minute at 90 PSI and 5 PSI drop.
F11 Series
Coalescing Filters (Oil Removal)

The contaminated air enters the element interior and is forced through a thick membrane (A) of "borosilicate" glass fibers coated with epoxy. Flow then passes through the element, and at this stage 99.97% of the sub-micron particles have been removed from the air stream. The tiny droplets coalesce together and are collected from the filter element by the outer drain layer.

The clean, filtered air now passes through and out into the pneumatic system. The air line coalescing filter removes liquid aerosols and sub-micron particulate matter. Collected liquids and particles in the "quiet zone" (B) should be drained before their level reaches a height where they would be reentrained in the flowing air. This can be accomplished by unscrewing the drain valve (C) slightly until the liquid begins to drain.

Technical Information

<table>
<thead>
<tr>
<th>Pressure Drop - bar</th>
<th>Primary Pressure - bar</th>
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<tbody>
<tr>
<td>0</td>
<td>2.4 bar</td>
</tr>
<tr>
<td>1</td>
<td>6.2 bar</td>
</tr>
<tr>
<td>2</td>
<td>10.3 bar</td>
</tr>
<tr>
<td>3</td>
<td>35 PSIG</td>
</tr>
<tr>
<td>4</td>
<td>90 PSIG</td>
</tr>
<tr>
<td>5</td>
<td>150 PSIG</td>
</tr>
</tbody>
</table>

F11 Filter Kits & Accessories

Drain Kits –
- Automatic Float Drain .......................................................... SA10MDSS
- Manual Twist Drain –
  Small (Old) ...................................................................... SA600Y7-1SS
  Large (New) ........................................................................ SAP05481

Filter Element Kits –
- 0.3 Micron ........................................................................ EKF71

Pipe Nipple –
- 1/2" 316 Stainless Steel .................................................. 616A28-SS

Specifications

- Bowl Capacity ................................................................. 4.0 Ounces
- Filter Rating ................................................................. 0.01 Micron
- Sump Capacity ............................................................... 1.7 Ounce
- Port Threads ................................................................. 1/2 Inch
- Pressure & Temperature Ratings –
  Manual Twist Drain ......................................................... 0 to 250 PSIG (0 to 17.2 bar)
  0°F to 150°F (-18°C to 66°C)
  Automatic Float Drain ...................................................... 15 to 175 PSIG (1 to 12 bar)
  32°F to 150°F (0°C to 66°C)

Note: Air must be dry enough to avoid ice formation at temperatures below 32°F (0°C).

Weight .................................................................................. 1.9 lb. (0.85 kg)

Materials of Construction

- Body .................................................................................. 316 Stainless Steel
- Bowls .................................................................................. 316 Stainless Steel
- Drain ................................................................................... 316 Stainless Steel
- Element Holder ................................................................. Acetal
- Filter Element ................................................................. Borosilicate Fiber
- Seals .................................................................................. Fluorocarbon
- Sight Gauge ....................................................................... Isoplast
R354, R364 Regulator – Miniature

**Features**

- Stainless Steel Construction Handles Most Corrosive Environments
- Large Diaphragm to Valve Area Ratio for Precise Regulation and High Flow Capacity
- Meets NACE Specifications MR-01-75/ISO 15156
- High Flow: 1/4” – 12 SCFM

<table>
<thead>
<tr>
<th>Series</th>
<th>Adjustment Type</th>
<th>Port Size</th>
<th>NPT</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>R364</td>
<td>Knob</td>
<td>1/4&quot;</td>
<td>R364-02CSS</td>
<td>A: 1.56 (40)</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>R364G02CSS</td>
<td>C: 2.00 (51)</td>
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<tr>
<td>R354</td>
<td>All Metal</td>
<td>1/4&quot;</td>
<td>R354-02CSS</td>
<td>C1: 2.56 (65)</td>
</tr>
</tbody>
</table>

Standard part numbers shown bold. For other models refer to ordering information below.

\[ \text{SCFM} = \text{Standard cubic feet per minute at 100 PSIG inlet, 75 PSIG no flow secondary setting and 15 PSIG pressure drop.} \]

**WARNING**

Product rupture can cause serious injury. Do not connect regulator to bottled gas. Do not exceed maximum primary pressure rating.

**Ordering Information**

<table>
<thead>
<tr>
<th>R364</th>
<th>02</th>
<th>C</th>
<th>SS</th>
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</table>

<table>
<thead>
<tr>
<th>Series</th>
<th>Port Type</th>
<th>Port Size</th>
<th>Pressure Range</th>
<th>Options</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>R354</td>
<td>NPT</td>
<td>02 1/4 Inch</td>
<td>A: 0-25 PSIG (0-1.7 bar)</td>
<td>Blank Relieving</td>
<td>SS Stainless Steel</td>
</tr>
<tr>
<td>R364</td>
<td>BSPP</td>
<td></td>
<td>B: 0-60 PSIG (0-4.1 bar)</td>
<td>Non-Relieving</td>
<td></td>
</tr>
</tbody>
</table>

BOLD ITEMS ARE MOST POPULAR.
R354, R364 Series
Air Line Regulators

Operation

With the adjusting knob (A) turned fully counter-clockwise (no spring load), and pressure supplied to the regulator inlet port, the valve poppet assembly (B) is closed. Turning the adjusting knob clockwise applies a load to control spring (C). This load causes the diaphragm (D) and the valve poppet assembly (B) to move downward allowing flow across the area (E) created between the poppet assembly and the seat. Pressure in the downstream line is sensed below the diaphragm (D) and offsets the load of spring (C). As downstream pressure rises, poppet assembly (B) and diaphragm (D) move upward until the area (E) is closed and the load of the spring (C) and pressure under diaphragm (D) are in balance. A reduced outlet pressure has now been obtained, depending on spring load. Creating a demand downstream, such as opening a valve, results in a reduced pressure under the diaphragm (D). The load of control spring (C) now causes the poppet assembly to move downward opening seat area (E) allowing air to flow to meet the downstream demand. The flow of downstream air is metered by the amount of opening (E).

Should downstream pressure exceed the desired regulated pressure, the excess pressure will cause the diaphragm (D) to move upward against control spring (C), open vent hole (F), and vent the excess pressure to atmosphere through the hole in the bonnet (H). (This occurs in the relieving type regulator only.)

Technical Information

CAUTION:
REGULATOR PRESSURE ADJUSTMENT –
The working range of knob adjustment is designed to permit outlet pressures within their full range. Pressure adjustment beyond this range is also possible because the knob is not a limiting device. This is a common characteristic of most industrial regulators, and limiting devices may be obtained only by special design.

For best performance, regulated pressure should always be set by increasing the pressure up to the desired setting.

R354, R364 Regulator Kits & Accessories
R354 Bonnet Kit .................................................. CKR354YSS
R364 Bonnet Kit (Knob Included) ............................... CKR364YSS
Gauge (Stainless) –
160 PSIG (0 to 1100 kPa), 1-1/2" Face ............ K515N14160SS
Panel Mount Bracket (Stainless) ................................. 161X57-SS
Panel Mount Nut –
Stainless .......................................................... R05X51-SS
Plastic .............................................................. R05X51-P
Pipe Nipple –
1/4" 316 Stainless Steel ....................................... 616Y28-SS
Service Kit –
Relieving .......................................................... RKR364YSS
Non-Relieving ...................................................... RKR364KYSS
Springs –
0-25 PSIG Range .............................................. SPR-375-2-SS
0-60 PSIG Range .............................................. SPR-376-1-SS
0-125 PSIG Range .............................................. SPR-377-1-SS

Specifications
Gauge Port .......................................................... 1/4 Inch
Operation .......................................................... Fluorocarbon Diaphragm

Port Threads .......................................................... 1/4 Inch
Pressure & Temperature Ratings –
R354 .................................................................. 300 PSIG Max (20.7 bar)
0°F to 180°F (-18°C to 82°C)
R364 .................................................................. 300 PSIG Max (20.7 bar)
0°F to 150°F (-18°C to 66°C)

Note: Air must be dry enough to avoid ice formation at temperatures below 32°F (0°C).

Weight ................................................................. 0.5 lb. (0.23 kg)

Materials of Construction
Adjustment Mechanism / Springs .................. 316 Stainless Steel
Adjusting Knob (R354) ..................................... 316 Stainless Steel
Adjusting Knob (R364) ..................................... Polypolyrene
Body ................................................................. 316 Stainless Steel
Bonnet (R354) ...................................................... 316 Stainless Steel
Bonnet (R364) ...................................................... Acetal
Bottom Plug ........................................................ 316 Stainless Steel
Poppet .............................................................. 316 Stainless Steel
Seals ................................................................. Fluorocarbon
**Features**

- Stainless Steel Construction Handles Most Corrosive Environments
- Large Daphragm to Valve Area Ratio for Precise Regulation and High Flow Capacity
- Meets NACE Specifications MR-01-75/ISO 15156
- Low Temperature Version Available
- High Flow: 1/2” – 80 SCFM

**Material**

- SS Stainless Steel

**Options**

- Blank Relieving K Non-Relieving
- L* Low Temp.
- P Panel Mount Nut

---

**WARNING**

Product rupture can cause serious injury. Do not connect regulator to bottled gas. Do not exceed maximum primary pressure rating.

---

**Ordering Information**

<table>
<thead>
<tr>
<th>Series</th>
<th>Adjustment Type</th>
<th>Port Size</th>
<th>NPT</th>
<th>BSPP</th>
</tr>
</thead>
<tbody>
<tr>
<td>R10</td>
<td>Knob</td>
<td>1/2&quot;</td>
<td>R10-04CSS</td>
<td>R10G04CSS</td>
</tr>
<tr>
<td>R11</td>
<td>Tee Handle</td>
<td>1/2&quot;</td>
<td>R11-04CSS</td>
<td>R11G04CSS</td>
</tr>
</tbody>
</table>

Standard part numbers shown bold. For other models refer to ordering information below.

---

**Dimensions**

<table>
<thead>
<tr>
<th>R10, R11 Regulator Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>A 2.34 (60)</td>
</tr>
<tr>
<td>C 4.70 (119)</td>
</tr>
<tr>
<td>E1 6.08 (154)</td>
</tr>
</tbody>
</table>

inches (mm)

Note: 1.75 Dia. (44mm) hole required for panel mounting.
Air Line Regulators

R10, R11 Series

With the adjusting knob / Tee Handle (A) turned fully counterclockwise (no spring load), and pressure supplied to the regulator inlet port, the valve poppet assembly (B) is closed. Turning the adjusting knob clockwise applies a load to control spring (C). This load causes the diaphragm (D) and the valve poppet assembly (B) to move downward allowing flow across the seat area (E) created between the poppet assembly and the seat. Pressure in the downstream line is sensed below the diaphragm (D) and offsets the load of spring (C). As downstream pressure rises, poppet assembly (B) and diaphragm (D) move upward until the area (E) is closed and the load of the spring (C) and pressure under diaphragm (D) are in balance. A reduced outlet pressure has now been obtained, depending on spring load. Creating a demand downstream, such as opening a valve, results in a reduced pressure under the diaphragm (D). The load of control spring (C) now causes the poppet assembly to move downward opening seat area (E) allowing air to flow to meet the downstream demand. The flow of downstream air is metered by the amount of opening (E).

Should downstream pressure exceed the desired regulated pressure, the excess pressure will cause the diaphragm (D) to move upward against control spring (C), open vent hole (F), and vent the excess pressure to atmosphere through the hole in the bonnet (H). (This occurs in the relieving type regulator only.)

---

**Technical Information**

**CAUTION:**
REGULATOR PRESSURE ADJUSTMENT –
The working range of knob adjustment is designed to permit outlet pressures within their full range. Pressure adjustment beyond this range is also possible because the knob is not a limiting device. This is a common characteristic of most industrial regulators, and limiting devices may be obtained only by special design.

For best performance, regulated pressure should always be set by increasing the pressure up to the desired setting.

*Note:* “Low Temperature” option is intended for applications where the ambient temperature may be down to -40° C/F. Air supply must be free of moisture to prevent ice formation and malfunction of units. These units contain EPDM seals. Make sure any oils in the airstream are compatible.

---

**R10, R11 Regulator Kits & Accessories**

- R10 Bonnet Kit (Knob Included) ........................................... CRK10YSS
- R11 Bonnet Kit ............................................................. CRK11YSS
- Gauge (Stainless) – 160 PSIG (0 to 1100 kPa), 2" Face ........... K4520N14160SS
- Panel Mount Bracket (Stainless) ............................... R10Y57-SS
  - Panel Mount Nut – Stainless ........................................ R10X51-SS
  - Plastic ................................................................. R10X51-P
- Pipe Nipple – 1/2" 316 Stainless Steel ......................... 616A28-SS
- Service Kit –
  - Relieving .......................................................... RKR10YSS
  - Non-Relieving ...................................................... RKR10KYSS
- Springs –
  - 0-60 PSIG Range ................................................. SPR-388-1-SS
  - 0-125 PSIG Range ............................................... SPR-389-1-SS
  - 0-250 PSIG Range ................................................. SPR-390-1-SS

---

**Specifications**

- Gauge Port .......................................................... 1/4 Inch
- Pressure Drop - bar .................................................. 0 1 2 3 4
- 0 10 20 30 40 50 60 70 80 90 100
- Pressure Drop - PSIG .............................................. 0 10 20 30 40 50 60 70 80 90 100
- Flow - Scfpm ......................................................... 0 5 10 15 20 25 30 35 40 45
- Flow - dm³/s .......................................................... 0 10 20 30 40 50 60 70 80 90 100

---

**Operation** ...................................................... Fluorocarbon Diaphragm

**Port Threads** ...................................................... 1/2 Inch

**Pressure & Temperature Ratings –**
- R10 .......................................................................... 300 PSIG Max (20.7 bar)
  0°F to 150°F (-18°C to 66°C)
- R11 .......................................................................... 300 PSIG Max (20.7 bar)
  0°F to 180°F (-18°C to 82°C)

**Option “L” Minimum Operating Temperature** .................. -40° C/F

*Note:* Air must be dry enough to avoid ice formation at temperatures below 32°F (0°C).

**Weight** .................................................................. 1.79 lb. (0.81 kg)

**Materials of Construction**

- Adjustment Mechanism / Springs .................. 316 Stainless Steel
- Body ................................................................. 316 Stainless Steel
- Bonnet / Tee Handle (R11) ................................. 316 Stainless Steel
- Bonnet / Knob (R10) ............................................. Acetal
- Bottom Plug .......................................................... 316 Stainless Steel
- Poppet ................................................................. 316 Stainless Steel
- Seals ................................................................. Fluorocarbon
B548, B558 Filter / Regulator – Miniature

Features
- Stainless Steel Construction
- Handles Most Corrosive Environments
- Large Diaphragm to Valve Area Ratio for Precise Regulation and High Flow Capacity
- 1/8" Female Threaded Drain
- High Flow: 1/4" – 12 SCFM§

Standard part numbers shown bold. For other models refer to ordering information below.

<table>
<thead>
<tr>
<th>Series</th>
<th>Adjustment Type</th>
<th>Port Size</th>
<th>NPT</th>
<th>BSPP</th>
</tr>
</thead>
<tbody>
<tr>
<td>B548</td>
<td>Knob</td>
<td>1/4&quot;</td>
<td>B548-02DHCSS</td>
<td>B548G02DHCSS</td>
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<tr>
<td>B558</td>
<td>All Metal</td>
<td>1/4&quot;</td>
<td>B558-02DHCSS</td>
<td>B558G02DHCSS</td>
</tr>
</tbody>
</table>

![B548 B558 Series](Pneumatic Division, Richland, Michigan www.wattsfluidair.com)

**WARNING**
Product rupture can cause serious injury.
Do not connect regulator to bottled gas.
Do not exceed maximum primary pressure rating.

Ordering Information

![B548 B558 Piggyback Dimensions](image)

**Material**
- SS Stainless Steel

**Options**
- Blank Relieving
- K Non-Relieving
- R Automatic Pulse
- Drain
- Panel
- Mount Nut

B548, B558 Series
1/4 Inch Ports
Turning the adjusting knob (A) clockwise applies a load to control spring (B) which forces diaphragm (C) and valve poppet assembly (D) to move downward allowing filtered air to flow through the seat area (E) created between the poppet assembly and the seat. “First stage filtration”. Air pressure supplied to the inlet port is directed through deflector plate (F) causing a swirling centrifugal action forcing liquids and coarse particles to the inner bowl wall (G) and down below the lower baffle (H) to the quiet zone. After liquids and large particles are removed in the first stage of filtration, “second stage filtration” occurs as air flows through element (J) where smaller particles are filtered out and retained. The air flow now passes through seat area (E) to the outlet port of the unit. Pressure in the downstream line is sensed below the diaphragm (C) and offsets the load of spring (B). When downstream pressure reaches the set-point, poppet valve assembly (D) and diaphragm (C) move upward closing seat area (E). Should downstream pressure exceed the desired regulated pressure, the excess pressure will cause the diaphragm (C) to move upward opening vent hole (K) venting the excess pressure to atmosphere through the hole in the bonnet (L). (This occurs in the standard relieving type filter/regulators only.)
Standard B11, B12 Series

1/2 Inch Ports

B11, B12 Filter / Regulator – Standard

Features
- Stainless Steel Construction
  Handles Most Corrosive Environments
- Large Diaphragm to Valve Area Ratio for Precise Regulation and High Flow Capacity
- 1/8” Female Threaded Drain
- Meets NACE Specifications MR-01-75/ISO-15156
- Low Temperature Version Available
- High Flow: 1/2” – 72 SCFM

Ordering Information

| B11 | 04 | W | J | C | SS |

Series
- B11 Standard Knob
- B12 Stainless Steel

Port Type
- NPT
- G BSPP

Bowl
- D Metal Bowl without Sight Gauge
- W Metal Bowl with Sight Gauge

Element
- J 40 Micron
- G 5 Micron

Reduced Pressure Range
- B 0-60 PSIG (0-4.1 bar)
- C 0-125 PSIG (0-8.5 bar)
- D 0-250 PSIG (0-17 bar)

Options
- Blank Relieving
- K Non-Relieving
- R Automatic Float Drain
- L* Low Temp.
- P Panel Mount Nut

Material
- SS Stainless Steel

BOLD ITEMS ARE MOST POPULAR.

NOTE:
- SCFM = Standard cubic feet per minute at 100 PSIG inlet, 90 PSIG no flow secondary setting and 15 PSIG pressure drop.
- 1.75 Dia. (44mm) hole required for panel mounting.

WARNING
Product rupture can cause serious injury. Do not connect regulator to bottled gas. Do not exceed maximum primary pressure rating.

Standard part numbers shown bold. For other models refer to ordering information below.

B11, B12 Piggyback Dimensions

<table>
<thead>
<tr>
<th>A</th>
<th>A1</th>
<th>B</th>
<th>C</th>
<th>C1</th>
<th>D</th>
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<td>(60)</td>
<td>(64)</td>
<td>(44)</td>
<td>(91)</td>
<td>(119)</td>
<td>(127)</td>
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<table>
<thead>
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<th>E</th>
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<th>F</th>
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<td>8.59</td>
<td>9.70</td>
<td>2.12</td>
</tr>
<tr>
<td>(218)</td>
<td>(246)</td>
<td>(54)</td>
</tr>
</tbody>
</table>

inches (mm)
Operation

Turning the adjusting knob / Tee Handle (A) clockwise applies a load to control spring (B) which forces diaphragm (C) and valve poppet assembly (D) to move downward allowing filtered air to flow through the seat area (E) created between the poppet assembly and the seat. “First stage filtration”. Air pressure supplied to the inlet port is directed through deflector plate (F) causing a swirling centrifugal action forcing liquids and coarse particles to the inner bowl wall (G) and down below the lower baffle (H) to the quiet area. After liquids and large particles are removed in the first stage of filtration “second stage filtration” occurs as air flows through element (J) where smaller particles are filtered out and retained. The air flow now passes through seat area (E) to the outlet port of the unit. Pressure in the downstream line is sensed below the diaphragm (C) and offsets the load of spring (B). When downstream pressure reaches the set-point, poppet valve assembly (D) and diaphragm (C) move upward closing seat area (E). Should downstream pressure exceed the desired regulated pressure, the excess pressure will cause the diaphragm (C) to move upward opening vent hole (K) venting the excess pressure to atmosphere through the hole in the bonnet (L). (This occurs in the standard relieving type filter/regulators only.)

Technical Information

CAUTION:
REGULATOR PRESSURE ADJUSTMENT –
The working range of knob adjustment is designed to permit outlet pressures within their full range. Pressure adjustment beyond this range is also possible because the knob is not a limiting device. This is a common characteristic of most industrial regulators, and limiting devices may be obtained only by special design.

For best performance, regulated pressure should always be set by increasing the pressure up to the desired setting.

*Note: “Low Temperature” option is intended for applications where the ambient temperature may be down to -40° C/F. Air supply must be free of moisture to prevent ice formation and malfunction of units. These units contain EPDM seals. Make sure any oils in the airstream are compatible.

B11, B12 Regulator Kits & Accessories

B11 Bonnet Kit (Knob Included) ........................................... CKR10YSS
B12 Bonnet Kit ................................................................. CKR11YSS

Drain Kit –
Automatic Float Drain .................................................. SA10MDSS
Manual Twist Drain –
Small (Old) ............................................................. SA600Y7-1SS
Large (New) ............................................................. SAP05481

Filter Element Kits –
Particulate (40 Micron) ................................................ EKF10Y
Particulate (5 Micron) ................................................ EKF10YV

Gauge (Stainless) –
160 PSIG (0 to 1100 kPa), 2” Face ..................K4520N14160SS

Panel Mount Bracket (Stainless) ....................................... R10Y57-SS
Panel Mount Nut –
Stainless .............................................................. R10X51-SS
Plastic ...................................................................... R10X51-P

Pipe Nipple –
1/2” 316 Stainless Steel ............................................. 616A28-SS

Service Kit –
Relieving .............................................................. RKR10YSS
Non-Relieving ........................................................ RKR10YSS

Springs –
0-60 PSIG Range ...................................................... SPR-388-1-SS
0-125 PSIG Range .................................................... SPR-389-1-SS
0-250 PSIG Range .................................................... SPR-390-1-SS

Specifications

Bowl Capacity .......................................................... 4.0 Ounces
Filter Rating ........................................................... 40 Micron

Gauge Port .............................................................. 1/4 Inch
Operation ................................................................. Fluorocarbon Diaphragm
Port Threads ............................................................ 1/2 Inch

Pressure & Temperature Ratings –
B11 (Metal Bowl D or W)........................................... 300 PSIG Max (20.7 bar)
0°F to 150°F (-18°C to 66°C)
B12 (Metal Bowl (D)) ................................................ 0 to 250 PSIG (0 to 17.2 bar)
0°F to 180°F (-18°C to 82°C)
B12 (Metal Bowl (W)) ................................................ 0 to 250 PSIG (0 to 17.2 bar)
0°F to 150°F (-18°C to 66°C)
Automatic Float Drain .............................................. 15 to 175 PSIG (1 to 12 bar)
32°F to 150°F (0°C to 66°C)

Option “L” Minimum Operating Temperature .................... -40° C/F

Note: Air must be dry enough to avoid ice formation at temperatures below 32°F (0°C).

Sump Capacity ......................................................... 1.7 Ounce
Weight ................................................................. 2.42 lb. (1.09 kg)

Materials of Construction

Adjustment Mechanism / Springs .................................. 316 Stainless Steel
Body ........................................................................ 316 Stainless Steel
Bonnet / Knob (B11) .................................................... Acetal
Bonnet / Tee Handle (B12) ........................................... 316 Stainless Steel
Bottom Plug ............................................................ 316 Stainless Steel
Poppet ................................................................. 316 Stainless Steel
Seals ....................................................................... Fluorocarbon
Sight Gauge ............................................................ Isoplast

www.wattsfluidair.com
L10 Lubricator – Standard

Features
- Stainless Steel Construction Handles Most Corrosive Environments
- 1/8" Female Threaded Drain
- Fillable Under Pressure
- Meets NACE Specifications MR-01-75/ISO 15156
- High Flow: 1/2" - 100 SCFM

<table>
<thead>
<tr>
<th>Port Size</th>
<th>NPT</th>
<th>BSPP</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/2&quot;</td>
<td>Manual Twist Drain</td>
<td>Manual Twist Drain</td>
</tr>
<tr>
<td></td>
<td>L10-04WSS</td>
<td>L10G04WSS</td>
</tr>
</tbody>
</table>

Bold Items are Most Popular.
For other models refer to ordering information below.

SCFM = Standard cubic feet per minute at 90 PSIG inlet, and 5 PSIG pressure drop.

Ordering Information

L10 — 04 W SS

Port Type
- NPT
- G BSPP

Port Size
- 04 1/2 Inch

Bowl
- D Metal Bowl without Sight Gauge
- W Metal Bowl with Sight Gauge

Material
- SS Stainless Steel

L10 Lubricator Dimensions

<table>
<thead>
<tr>
<th>A</th>
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<tbody>
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<td>2.52 (64)</td>
<td>1.73 (44)</td>
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<th>E</th>
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<table>
<thead>
<tr>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.50 (89)</td>
</tr>
</tbody>
</table>

inches (mm)
Air flowing through the unit goes through two paths. At low flow rates the majority of the air flows through the Venturi section (A). The rest of the air opens the check valve (C). The velocity of the air flowing through the Venturi section (A) creates a pressure drop. This lower pressure allows the oil to be forced from the reservoir through the pickup tube (B) and travels up to the metering screw (D). The rate of oil delivery is then controlled by adjusting the metering screw (D). Oil flows past the metering screw (D) and forms a drop in the nozzle tube (E). As the oil drops through the dome (F) and back into the Venturi section (A), it is broken up into fine particles. It is then mixed with the air flowing past the check valve (C) and is carried downstream. As the air flow increases the check valve (C) will open more fully. This additional flow will assure that the oil delivery rate will increase linearly with the increase of air flow.

---

**Technical Information**

**L10 Filter Kits & Accessories**

- **Drain Kit** –
  - Manual Twist Drain –
    - Small (Old) ................................................. SA600Y7-1SS
    - Large (New) .................................................. SAP05481

- **Pipe Nipple** –
  - 1/2” 316 Stainless Steel ................................. 616A28-SS

- **Sight Dome Kit** –
  - (Old) ............................................................ RKL10SS
  - (New) ............................................................. PS740N

**Specifications**

- **Bowl Capacity** ............................................. 4.0 Ounces
- **Port Threads** ............................................ 1/2 Inch
- **Pressure & Temperature Ratings** –
  - Metal Bowl (D) ............................................. 300 PSIG Max (20.7 bar)
  - 0°F to 150°F (-18°C to 66°C)

**Materials of Construction**

- **Body** .......................................................... 316 Stainless Steel
- **Bowl** .......................................................... 316 Stainless Steel
- **Dip Tube** ..................................................... 316 Stainless Steel
- **Drain** .......................................................... 316 Stainless Steel
- **Fill Plug** ...................................................... 316 Stainless Steel
- **Seals** .......................................................... Fluorocarbon
- **Sight Dome** .................................................. Nylon
- **Sight Gauge** ................................................... Isoplast

---

**Technical Specifications – L10**

**L10 Series**

**Air Line Lubricators**

---

**Metal Bowl (W) ............................................... 0 to 250 PSIG (0 to 17.2 bar)
0°F to 150°F (-18°C to 66°C)**

**Note:** Air must be dry enough to avoid ice formation at temperatures below 32°F (0°C).

**Weight .......................................................... 1.9 lb. (0.85 kg)**
Safety Guide For Selecting And Using Pneumatic Division Products And Related Accessories

WARNING:
FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF PNEUMATIC DIVISION PRODUCTS, ASSEMBLIES OR RELATED ITEMS (“PRODUCTS”) CAN CAUSE DEATH, PERSONAL INJURY, AND PROPERTY DAMAGE. POSSIBLE CONSEQUENCES OF FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THESE PRODUCTS INCLUDE BUT ARE NOT LIMITED TO:

• Unintended or mistimed cycling or motion of machine members or failure to cycle
• Work pieces or component parts being thrown off at high speeds.
• Failure of a device to function properly for example, failure to clamp or unclamp an associated item or device.
• Explosion
• Suddenly moving or falling objects.
• Release of toxic or otherwise injurious liquids or gasses.

Before selecting or using any of these Products, it is important that you read and follow the instructions below.

1. GENERAL INSTRUCTIONS

1.1. Scope: This safety guide is designed to cover general guidelines on the installation, use, and maintenance of Pneumatic Division Valves, FRLs (Filters pressure Regulators and Lubricators), Vacuum products and related accessory components.

1.2. Fail-Safe: Valves, FRLs, Vacuum products and their related components can and do fail without warning for many reasons. Design all systems and equipment in a fail-safe mode, so that failure of associated valves, FRLs or Vacuum products will not endanger persons or property.


1.4. Distribution: Provide a copy of this safety guide to each person that is responsible for selection, installation, or use of Valves, FRLs or Vacuum products. Do not select, or use Watts valves, FRLs or vacuum products without thoroughly reading and understanding this safety guide as well as the specific Watts publications for the products considered or selected.

1.5. User Responsibility: Due to the wide variety of operating conditions and applications for valves, FRLs, and vacuum products Watts and its distributors do not represent or warrant that any particular valve, FRL or vacuum product is suitable for any specific end use system. This safety guide does not analyze all technical parameters that must be considered in selecting a product. The user, through its own analysis and testing, is solely responsible for:

• Making the final selection of the appropriate valve, FRL, Vacuum component, or accessory.
• Assuring that all user’s performance, endurance, maintenance, safety, and warning requirements are met and that the application presents no health or safety hazards.
• Complying with all existing warning labels and / or providing all appropriate health and safety warnings on the equipment on which the valves, FRLs or Vacuum products are used; and,
• Assuring compliance with all applicable government and industry standards.

1.6. Safety Devices: Safety devices should not be removed, or defeated.

1.7. Warning Labels: Warning labels should not be removed, painted over or otherwise obscured.

1.8. Additional Questions: Call the appropriate Watts technical service department if you have any questions or require any additional information. See the Watts publication for the product being considered or used, or call 269-629-5000, or go to www.wattsfluidair.com, for telephone numbers of the appropriate technical service department.

2. PRODUCT SELECTION INSTRUCTIONS

2.1. Flow Rate: The flow rate requirements of a system are frequently the primary consideration when designing any pneumatic system. System components need to be able to provide adequate flow and pressure for the desired application.

2.2. Pressure Rating: Never exceed the rated pressure of a product. Consult product labeling, Pneumatic Division catalogs or the instruction sheets supplied for maximum pressure ratings.

2.3. Temperature Rating: Never exceed the temperature rating of a product. Excessive heat can shorten the life expectancy of a product and result in complete product failure.

2.4. Environment: Many environmental conditions can affect the integrity and suitability of a product for a given application. Pneumatic Division products are designed for use in general purpose industrial applications. If these products are to be used in unusual circumstances such as direct sunlight and/or corrosive or caustic environments, such use can shorten the useful life and lead to premature failure of a product.

2.5. Lubrication and Compressor Carryover: Some modern synthetic oils can and will attack nitrile seals. If there is any possibility of synthetic oils or greases migrating into the pneumatic components check for compatibility with the seal materials used. Consult the factory or product literature for materials of construction.

2.6. Polycarbonate Bowls and Sight Glasses: To avoid potential polycarbonate bowl failures:

• Do not locate polycarbonate bowls or sight glasses in areas where they could be subject to direct sunlight, impact blow, or temperatures outside of the rated range.
• Do not expose or clean polycarbonate bowls with detergents, chlorinated hydro-carbons, keytones, esters or certain alcohols.
• Do not use polycarbonate bowls or sight glasses in air systems where compressors are lubricated with fire resistant fluids such as phosphate ester and di-ester lubricants.
2.7. Chemical Compatibility: For more information on plastic component chemical compatibility see Pneumatic Division technical bulletins Tec-3, Tec-4, and Tec-5

2.8. Product Rupture: Product rupture can cause death, serious personal injury, and property damage.
- Do not connect pressure regulators or other Pneumatic Division products to bottled gas cylinders.
- Do not exceed the maximum primary pressure rating of any pressure regulator or any system component.
- Consult product labeling or product literature for pressure rating limitations.

3. PRODUCT ASSEMBLY AND INSTALLATION INSTRUCTIONS

3.1. Component Inspection: Prior to assembly or installation a careful examination of the valves, FRLs or vacuum products must be performed. All components must be checked for correct style, size, and catalog number. DO NOT use any component that displays any signs of nonconformance.

3.2. Installation Instructions: Watts published Installation Instructions must be followed for installation of Watts valves, FRLs and vacuum components. These instructions are provided with every Watts valve or FRL sold, or by calling 269-629-5000, or at www.wattsfluidair.com.

3.3. Air Supply: The air supply or control medium supplied to Valves, FRLs and Vacuum components must be moisture-free if ambient temperature can drop below freezing

4. VALVE AND FRL MAINTENANCE AND REPLACEMENT INSTRUCTIONS

4.1. Maintenance: Even with proper selection and installation, valve, FRL and vacuum products service life may be significantly reduced without a continuing maintenance program. The severity of the application, risk potential from a component failure, and experience with any known failures in the application or in similar applications should determine the frequency of inspections and the servicing or replacement of Pneumatic Division products so that products are replaced before any failure occurs. A maintenance program must be established and followed by the user and, at minimum, must include instructions 4.2 through 4.10.

4.2. Installation and Service Instructions: Before attempting to service or replace any worn or damaged parts consult the appropriate Service Bulletin for the valve or FRL in question for the appropriate practices to service the unit in question. These Service and Installation Instructions are provided with every Watts valve and FRL sold, or are available by calling 269-629-5000, or by accessing the Watts web site at www.wattsfluidair.com.


4.4. Visual Inspection: Any of the following conditions requires immediate system shut down and replacement of worn or damaged components:
- Air leakage: Look and listen to see if there are any signs of visual damage to any of the components in the system. Leakage is an indication of worn or damaged components.
- Damaged or degraded components: Look to see if there are any visible signs of wear or component degradation.
- Kinked, crushed, or damaged hoses: Kinked hoses can result in restricted air flow and lead to unpredictable system behavior.
- Any observed improper system or component function: Immediately shut down the system and correct malfunction.
- Excessive dirt build-up: Dirt and clutter can mask potentially hazardous situations.

Caution: Leak detection solutions should be rinsed off after use.

4.5. Routine Maintenance Issues:
- Remove excessive dirt, grime and clutter from work areas.
- Make sure all required guards and shields are in place.

4.6. Functional Test: Before initiating automatic operation, operate the system manually to make sure all required functions operate properly and safely.

4.7. Service or Replacement Intervals: It is the user’s responsibility to establish appropriate service intervals. Valves, FRLs and vacuum products contain components that age, harden, wear, and otherwise deteriorate over time. Environmental conditions can significantly accelerate this process. Valves, FRLs and vacuum components need to be serviced or replaced on routine intervals. Service intervals need to be established based on:
- Previous performance experiences.
- Government and / or industrial standards.
- When failures could result in unacceptable down time, equipment damage or personal injury risk.

4.8. Servicing or Replacing of any Worn or Damaged Parts: To avoid unpredictable system behavior that can cause death, personal injury and property damage:
- Disconnect electrical supply (when necessary) before installation, servicing, or conversion.
- Disconnect air supply and depressurize all air lines connected to system and Pneumatic Division products before installation, service, or conversion.
- Installation, servicing, and / or conversion of these products must be performed by knowledgeable personnel who understand how pneumatic products are to be applied.
- After installation, servicing, or conversions air and electrical supplies (when necessary) should be connected and the product tested for proper function and leakage. If audible leakage is present, or if the product does not operate properly, do not put product or system into use.
- Warnings and specifications on the product should not be covered or painted over. If masking is not possible, contact your local representative for replacement labels.

4.9. Putting Serviced System Back into Operation: Follow the guidelines above and all relevant Installation and Maintenance Instructions supplied with the valve FRL or vacuum component to insure proper function of the system.
Offer of Sale

The items described in this document and other documents or descriptions provided by Parker Hannifin Corporation, its subsidiaries and its authorized distributors, are hereby offered for sale at prices to be established by Parker Hannifin Corporation, its subsidiaries and any authorized distributors. The terms and conditions (“Buyer”) shall be governed by all of the following Terms and Conditions. Buyer’s order for any such item, when communicated to Parker Hannifin Corporation, its subsidiaries or an authorized distributor (“Seller”) verbally or in writing, shall constitute acceptance of this offer.

1. Terms and Conditions of Sale: All descriptions, quotations, proposals, offers, acknowledgments, acceptances and sales of Seller’s products are subject to and shall be governed exclusively by the terms and conditions stated herein. Buyer’s acceptance of any offer to sell is limited to these terms and conditions. Any terms contained in Buyer’s order, when communicated to Seller, are hereby objected to. No such additional, different or inconsistent terms and conditions shall become part of the contract between Buyer and Seller unless expressly accepted in writing by Seller. Seller’s acceptance of any offer to purchase by Buyer is conditional upon Buyer’s assent to all the terms and conditions stated herein, including any terms in addition to, or inconsistent with those contained in Buyer’s offer. Acceptance of Seller’s products shall in all events constitute such assent.

2. Payment: Payment shall be made by Buyer net 30 days from the date of delivery of the items purchased hereunder. Amounts not timely paid shall bear interest at the maximum rate permitted by law for each month or portion thereof that the Buyer is late in making payment. Any claims by Buyer for omissions or shortages in a shipment shall be waived unless Seller receives notice thereof within 30 days after Buyer’s receipt of the shipment.

3. Delivery: Unless otherwise provided on the face hereof, delivery shall be made F.O.B. Seller’s plant. Regardless of the method of delivery, however, risk of loss shall pass to Buyer upon Seller’s delivery to a carrier. Any delivery dates shown are approximate only and Seller shall have no liability for any delays in delivery.

4. Warranty: Seller warrants that the items sold hereunder shall be free from defects in material or workmanship for a period of 18 months from date of shipment from Parker Hannifin Corporation. THIS WARRANTY COM普ES THE SOLE AND ENTIRE WARRANTY PERTAINING TO ITEMS PROVIDED HEREUNDER, SELLER MAKES NO OTHER WARRANTY, GUARANTEE, OR REPRESENTATION OF ANY KIND WHATSOEVER. ALL OTHER WARRANTIES, INCLUDING BUT NOT LIMITED TO, MERCHANTABILITY AND FITNESS FOR PURPOSE, WHETHER EXPRESS, IMPLIED, OR ARISING BY OPERATION OF LAW, TRADE USAGE, OR COURSE OF DEALING ARE HEREBY DISCLAIMED. NOTWITHSTANDING THE FOREGOING, THERE ARE NO WARRANTIES WHATSOEVER ON ITEMS BUILT OR ACQUIRED WHOLLY OR PARTIALLY, TO BUYER’S DESIGN OR SPECIFICATIONS.

5. Limitation of Remedy: SELLER’S LIABILITY ARISING FROM OR IN ANY WAY CONNECTED WITH THE ITEMS SOLD OR THIS CONTRACT SHALL BE LIMITED EXCLUSIVELY TO REPLACEMENT OF THE ITEMS SOLD OR REFUND OF THE PURCHASE PRICE PAID BY BUYER, AT SELLER’S SOLE OPTION. IN NO EVENT SHALL SELLER BE LIABLE FOR ANY INCIDENTAL, CONSEQUENTIAL OR SPECIAL DAMAGES OF ANY KIND OR NATURE WHATSOEVER, INCLUDING BUT NOT LIMITED TO LOST PROFITS ARISING FROM OR IN ANY WAY CONNECTED WITH THIS AGREEMENT OR ITEMS SOLD HEREUNDER, WHETHER ALLEGED TO ARISE FROM BREACH OF CONTRACT, EXPRESS OR IMPLIED WARRANTY, OR IN TORT, INCLUDING WITHOUT LIMITATION, NEGLIGENCE, FAULT, FAILURE TO WARN OR STRICT LIABILITY.

6. Changes, Reschedules and Cancellations: Buyer may request to modify the designs or specifications for the items sold hereunder as well as the quantities and delivery dates thereof, or may request to cancel all or part of this order, however, no such requested modification or cancellation shall become part of the contract between Buyer and Seller unless accepted by Seller in a written amendment to this Agreement. Acceptance of any such requested modification or cancellation shall be at Seller’s discretion, and shall be upon such terms and conditions as Seller may require.

7. Special Tooling: A tooling charge may be imposed for any special tooling or equipment, without limitations, dies, fixtures, molds and patterns, acquired to manufacture items sold pursuant to this contract. Such special tooling shall be and remain Seller’s property notwithstanding payment of any charges by Buyer. In no event will Buyer acquire any interest in any apparatus belonging to Seller which is utilized in the manufacture of the items sold hereunder, even if such apparatus has been specially converted or installed for Buyer’s use; and Buyer’s interest in any apparatus so converted or installed shall be and remain Seller’s property, and notwithstanding any charges paid by Buyer. Unless otherwise agreed, Seller shall have the right to alter, discard or otherwise dispose of any special tooling or other property in its sole discretion at any time.

8. Buyer’s Property: Any designs, tools, patterns, materials, drawings, confidential information or equipment furnished by Buyer, or any other items which become Buyer’s property, may be considered obsolete and may be destroyed by Seller if two (2) consecutive years have elapsed without Buyer placing an order for the items which are manufactured using such property. Seller shall not be responsible for any loss or damage to such property while it is in Seller’s possession or control.

9. Taxes: Unless otherwise indicated on the face hereof, all prices and charges are exclusive of excise, sales, use, property, occupational or any taxes which may be imposed by any taxing authority upon the manufacture, sale or delivery of the items sold hereunder. If any such taxes must be paid by Seller or if Seller is liable for the collection of such tax, the amount thereof shall be in addition to the amounts for the items sold. Buyer agrees to pay all such taxes or to reimburse Seller therefore upon receipt of its invoice. If Buyer claims exemption from any sales, use or other tax imposed by any taxing authority, Buyer shall save Seller harmless from and against any such tax, together with any interest or penalties thereon which may be assessed if the items are taxable.

10. Indemnity For Infringement of Intellectual Property Rights: Seller shall have no liability for infringement of any patents, trademarks, copyrights, trade dress, trade secrets or similar rights except as provided in this Part 10. Seller will defend and indemnify Buyer against allegations of infringement of U.S. patents, U.S. trademarks, copyrights, trade dress and trade secrets (hereinafter “Intellectual Property Rights”), Seller will defend at its expense and will pay the cost of any settlement or damages awarded in an action brought against Buyer based on an allegation that an item sold pursuant to this contract infringes the Intellectual Property Rights of a third party. Seller’s obligation to defend and indemnify Buyer is contingent on Buyer notifying Seller within ten (10) days after Buyer becomes aware of such allegations of infringement, and Seller having sole control over the defense of any allegations or actions including all negotiations for settlement or compromise. If an item sold hereunder is subject to a claim that it infringes the Intellectual Property Rights of a third party, Seller may, at its sole expense and option, procure for Buyer the right to continue using said item, replace or modify said item so as to make it noninfringing, or offer to accept return of said item and return the purchase price less a reasonable allowance for depreciation. Notwithstanding the foregoing, Seller shall have no liability for infringement based on the designs, tools, patterns, material, drawings, and special tooling sold hereunder for which the designs are specified in whole or part by Buyer, or infringements resulting from the modification, combination or use in a system of any item sold hereunder. The foregoing provisions of this Part 10 shall constitute Seller’s sole and exclusive liability and Buyer’s sole and exclusive remedy for infringement of Intellectual Property Rights.

11. Force Majeure: Seller does not assume the risk of and shall not be liable for delay or failure to perform any of Seller’s obligations by reason of circumstances beyond the reasonable control of Seller (hereinafter “Events of Force Majeure”). Events of Force Majeure shall include without limitation, accidents, acts of God, strikes or labor disputes, acts, laws, rules or regulations of any government or any agency, war, fire, floods, delays or failures in delivery of carriers or suppliers, shortages of materials and any other cause beyond Seller’s control.

12. Entire Agreement/Governing Law: The terms and conditions set forth herein, together with any amendments, modifications and any additional terms or conditions expressly or impliedly accepted by Seller in writing, shall constitute the entire Agreement concerning the items sold, and there are no oral or other representations or agreements which pertain thereto. This Agreement shall be governed in all respects by the law of the State of Ohio. No actions arising out of sale of the items sold hereunder or this Agreement may be brought by either party more than two (2) years after the cause of action accrues.